SYNTHESIS AND CHARACTERIZATION OF PALM BASED POLYURETHANE COMPOSITE WITH RIVER SAND AS A FILLER

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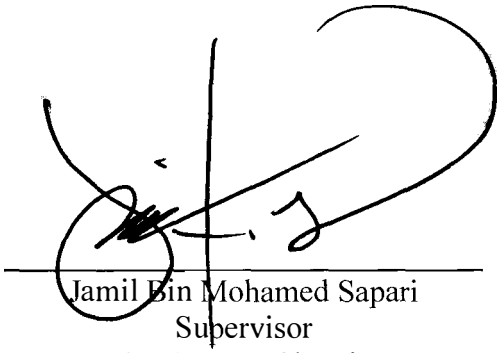
This Final Year Project entitled "**Synthesis and Characterization of Palm Based Polyurethane Composite with River Sand as a Filler"** was submitted by Farid Bin Abdul Aziz, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry, in the Faculty of Applied Sciences, and was approved by



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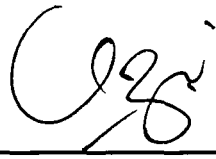

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ABSTRACT

SYNTHESIS OF PALM BASED POLYOL FOR RIGID POLYURETHANE COMPOSITE WITH RIVER SAND FILLER

The use of river sand as a filler in synthesizing polyurethane (PU) have potential benefit to synthesize PU composite. This study carried out to determine the potential of river sand and palm oil in preparation of rigid PU composite. The river sand was first sieve to reach the micro size. Then the palm oil used, which is palm kernel oil was then mixed with polyhydric compound to synthesize polyol via transesterification reaction. The PKO-based polyol was then mixed with other chemicals at different ratio to form PU control rigid foam. Then different composition of river sand was used, which is 5%, 10%, and 15% was used to synthesize PU rigid foam with different composition. The formation of urethane linkage (NHCOO) backbone in PU foam was confirmed using FTIR at wavenumber 3313 cm^{-1}. The morphological structure of the surface was analyzed using scanning electron microscope at 20 x, 50 x, 150 x and 500 x magnification . The compression test of polyurethane with 15% filler have average compressive load of 8.344 kPa which is higher than other composition which is 6.662 kPa for 5% filler and 7.6630 kPa for 10% filler. This study shows that adding filler to PU increases its structure and strength of the composite. TGA analysis at T_{10} values for PU control and PU river sand were almost identical. However, the T_{50} values of the hybrids increased to 457.34 °C